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Abstract

EXPERIENCE IN THE TRANSPORT OF IRRADIATED FUEL

by

* N. F. C. Bishop
* J. C. Egan
* W. W. Marshall

1. The routine movements of irradiated fuel within the United Kingdom are described; this includes the transport of irradiated magnox canned natural uranium fuels by road from Chapelcross to Windscale and by rail from the U.K. civil nuclear power stations to Windscale. Details are provided of the transport containers, the vehicles and the general organization of these movements. Also included is a description of a container in which dry magnox canned elements are transported.

2. Similar information is given for the transport of M.T.R. type fuel elements both between Harwell and Dounreay and from Australia and Denmark to Dounreay.

3. The extension of this transport service to further overseas reactors is discussed with particular reference to the technical and engineering support work in aid of the transport of irradiated magnox fuel from Italy and Japan to reprocessing plants in the U.K. This includes a description of the type of vehicle which could be used both for transporting magnox fuels in water at low temperature to minimise corrosion effects and also fuels from advanced gas cooled and water moderated reactors where mechanical cooling equipment is required to maintain regulatory temperature requirements.

4. An outline of the supporting design and development work is given; this includes a description of the experimental work on the transport of magnox clad fuels in aqueous heat transfer media which led to the decision to use mechanically cooled transport containers. The selection and use of alternative heat transfer media is discussed and some indication is given of the problems which arise from the use of organic media.

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* U.K. Atomic Energy Authority, Production Group, Risley

5. Indications of cost are provided for transport containers and vehicles and of freight rates for both rail and sea journeys.

6. It is shown that as the design of transport equipment is closely related to regulatory requirements substantial reductions in the capital cost of this equipment may not be possible but that reductions in the overall cost of transport operations could be achieved by maintaining high equipment utilisation factors. It is suggested that the current trend in which reactor operators accept responsibility for the return of irradiated fuel is uneconomic and that, the growth of a limited number of specialist transport organisations should be encouraged.